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PATENT SPECIFICATION

612,939

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No. 29787/46.

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PROVISIONAL SPECIFICATION

No. 17346 A.D. 1946.

Improvements in or relating to Machines for Marking Razor
Blades

We, MORGAN FAIREST LIMITED, a British Company, and EDWARD VINCENT DICKINSON, a British Subject, both of Fairway Works, Sorby Street, Sheffield, do hereby declare the nature of this invention to be as follows:—

This invention relates to machines for marking razor blades in the form of continuous strip by operations such as etching that require brushing of the marked strip, and is particularly directed to improved means for brushing the strip.

A typical lay-out of machine comprises feed rollers delivering slack strip to a registering roller having protuberances meshing with at least one aperture in each blade length, a marking roll or a pair of marking rolls for applying marking liquid to one or both sides of the strip and driven at exactly the same speed as the registering roller and in register with the blade lengths, and, where etching fluid has to be removed from the strip, a washing tank or the like, and drying means, such as spaced insulated contact pads supplied with low-voltage current to raise the temperature of the length of strip extended between them.

According to the present invention, the marked strip is cleaned by means of a pair of rotating brushes to operate on opposite sides of the strip, a common drive for the two brushes, rotating the brushes in opposite directions, and means to adjust the centre of one brush with respect to the

other without disturbing the drive. Periodic adjustment may thus be made to take up wear of the brushes and maintain effective cleaning of the strip. The adjustment may, moreover, permit separation of the brushes to facilitate starting up.

When the strip has been washed, as after etching, the accurate adjustment possible with the brush drive leaves a minimum and uniform amount of liquid to be eliminated by the drying means.

In a preferred embodiment of the invention, the brushes are driven by a chain or belt from a sprocket or pulley on the driven shaft of one of the brushes, and a pivoted bracket carries the other brush and also an idle sprocket or pulley that co-operates with an independent idler to maintain a substantial arc of contact with the driving sprocket or pulley over the range of movement of the bracket about its pivot. A single chain or belt thus suffices to drive the adjustable brush from the driven brush. A screw or other fine adjustment is provided to position the bracket. In addition, a lever or cam may be provided to effect greater movement of the bracket to separate the brushes and return them to adjusted operative position.

Dated this 7th day of June, 1946.

GREENWOOD & HULSE,

Chartered Patent Agents,

Town Hall Chambers,

87, Fargate, Sheffield, 1.

PROVISIONAL SPECIFICATION

No. 29787 A.D. 1946.

Improvements in or relating to Machines for Marking Razor
Blades

We, MORGAN FAIREST LIMITED, a British Company, and EDWARD VINCENT DICKINSON, a British Subject, of Fairway Works, Sorby Street, Sheffield, do
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hereby declare the nature of this invention to be as follows:—

This invention relates to machines for marking razor blades by etching, and is particularly directed to etching blades in the form of a continuous strip.

According to the present invention, a strip-etching machine comprises a registering roller having protuberances meshing with apertures in the strip, an etching roll or pair of rolls for applying etching material to one or both sides of the strip and adapted to be driven at the same peripheral speed as the registering roller, means for washing etching material from the strip, and drying means in the form of spaced insulated contact pads adapted to be supplied with low-voltage current to raise the temperature of the length of the strip extended between them.

According to another feature of the invention, the various rollers over or between which the strip is guided are overhung from the machine frame to facilitate leading the strip into the machine. Preferably, all endwise threading of the strip is eliminated. For the same purpose, the contact pads each comprise a pair of members, one or both of which are movable so as to present a gap into which the strip may be inserted from the side.

According to a still further feature of the invention, the drying run of the strip is arranged as a loop and the etching and washing, and, preferably, brushing runs are arranged as a larger loop surrounding the drying loop, with the result that the operations may be closely grouped. The machine is thus very compact, and may also have feed and delivery adjacent to each other, with advantages in controlling and inspecting the working of the machine.

One construction of machine embodying the above features will now be described in greater detail.

The machine frame comprises a vertical plate forming the front of an open-backed box of which the sides are formed by the two end plates of the frame, the base plate of the frame, and the top plate of the frame. Within the box are housed a driving motor and a transformer. Two apertures in the vertical plate are closed by panels carrying etching and brushing units respectively, with drive shafts protruding rearwardly into the box and operating members protruding forwardly of the machine.

The etching unit comprises a feed roller and counterweighted presser roll for drawing strip from a supply spool rotatable on a spindle at one end of the frame, a registering roll between which and the feed

roll is spaced for a loop of slack strip, a pair of etching rolls covered with rubber pads of the required pattern to be etched, and etching liquid troughs from which liquid is transferred to the etching rolls, e.g. by means of wicks and transfer rolls contacting with and rotated by the etching rolls. The feed, registering, and etching rolls are all driven at the same peripheral speed. The etching rolls may be adjusted to and from the registering roll to enable the etched pattern to be accurately registered with each blade length. One or both etching rolls may be movable to and from the other to adjust their pressure on the strip.

The brushing panel comprises two rotatable brushes rotating against the direction of the motion of the strip between them. One brush has a fixed axis from which a drive is taken to an intermediate shaft from which the other brush is hung pendulum-fashion and from which it is driven, one of the drives being crossed to reverse the direction of rotation of the second brush. A jockey pulley is conveniently mounted on an end of the intermediate shaft protruding forwardly of the panel. The pendulum brush maintains pressure on the strip notwithstanding wearing of the brushes.

Below the two panels, a washing tank is carried on a forward extension of the base of the machine frame.

Between the panels, space is left for the drying loop, formed by two fixed insulated rollers overhanging from the top plate of the frame and an intermediate lower, and preferably adjustable, insulated roller. Above each panel, a pair of contact pads is mounted, the lower pad of each pair being fixed to and insulated from the top plate, and the upper pad being adapted to press the strip between itself and the lower pad. Conveniently, the pads of each pair are interconnected by parallel links to permit the one pad to bed firmly on to the strip, the links being confined to the rear of the pads to leave the front unobstructed for the insertion of the strip. Advantageously, a lever or pedal is provided to enable both upper pads to be lifted or lowered simultaneously.

Pull-through nip rolls, rotatable at the same peripheral speed as the rolls of the etching unit draw the etched strip from the loose loop formed by the delivery of the strip from the etching rolls into the washing tank, past the brushing rolls, and through the contact pads and intermediate drying loop. A switch enables current to be applied only after the strip has been set in motion, to avoid overheating, from the pull-through rolls, the strip is spooled at a position above the supply spool. A

switch at that end of the machine controls the driving motor.

Dated this 4th day of October, 1946.
GREENWOOD & HULSE,
Chartered Patent Agents,
Town Hall Chambers,
87, Fargate, Sheffield, 1.

COMPLETE SPECIFICATION

Improvements in or relating to Machines for Marking Razor Blades

We, MORGAN FAIREST LIMITED, a British Company, and EDWARD VINCENT DICKINSON, a British Subject, both of Fairway Works, Sorby Street, Sheffield, 4, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to machines for marking razor blades by etching, and is particularly directed to etching blades in the form of a continuous strip.

According to the present invention, a strip-etching machine comprises a registering roller having protuberances meshing with apertures in the strip, an etching roll or pair of rolls for applying etching material to one or both sides of the strip and adapted to be driven at the same peripheral speed as the registering roller, means for washing etching material from the strip, and drying means in the form of insulated contact pads spaced apart longitudinally of the strip and adapted to be supplied with low-voltage current to raise the temperature of the length of the strip extended between them.

The length of the drying-run may be adjustable, as also the applied voltage (e.g. by tapplings on a transformer) in accordance with the amount of drying needed by the strip under treatment. The contact pads and other metallic contacts with the strip near to the pads are insulated to confine the heating current to the desired length of strip extending between the pads.

According to another feature of the invention, the various rollers over or between which the strip is guided are overhung from the machine frame to facilitate leading the strip into the machine. Preferably, all endwise threading of the strip is eliminated. For the same purpose, the contact pads each comprise a pair of pad members, one of which is movable with respect to the other so as to present a gap into which the strip may be inserted from the side.

According to a still further feature of the invention, the drying run of the strip

is arranged as a loop and the etching and washing, and, preferably, brushing runs are arranged in a larger loop surrounding the drying loop, with the result that the operations may be closely grouped. The machine is thus very compact, and may also have feed and delivery adjacent to each other with advantages in controlling and inspecting the working of the machine.

One construction of machine embodying the above features of the invention will now be described in greater detail with reference to the accompanying drawings in which,

Figure 1 is a view in elevation of the machine;

Figure 2 is a plan view of Figure 1;

Figure 3 is an end view of Figure 1;

Figure 4 is a rear elevation of a pair of contact pads;

Figure 5 is a section on the line 5—5 of Figure 4;

Figure 6 is a side elevation of a pulley drive;

Figure 7 is a rear elevation of the feed and etching roller drive;

Figure 8 is a rear elevation of the cleaning brush drive;

Figure 9 is a side elevation corresponding to Figure 8, but looking from the left of Figure 1; and

Figures 10 and 11 are part-sectional front and side elevations of one etching-roller unit.

The machine frame 10 is in the form of an open-backed box comprising a front vertical plate 11, two end plates 12, 13 a base plate 14 and a top plate 15. Within the frame is housed a driving motor 16 mounted on a stand 17 secured to the base plate 14. The motor drives, through a belt 18, a lay-shaft 19 journalled in bearings 20 also mounted on the stand 17. Two apertures 21, 22 in the front plate 11 are closed by panels 23, 24 carrying etching and brushing units respectively, the operating members of the units protruding forwardly of the machine and drive shafts for these members protruding rearwardly through the apertures 21, 22 into the box of the

frame to be driven from the lay-shaft 19, as will be hereinafter described.

The etching unit, carried by the panel 23, comprises a feed roll 25 mounted on a drive shaft 26 and having a coacting presser roll 27, a registering roll 28 on a drive shaft 29, and a pair of etching rolls 30 on drive shafts 31A, 31B. The inner end of the shaft 31A is fitted with a pulley 32 and is driven directly from a pulley 33 on the lay-shaft 19 through a belt 34. The drive is transmitted to the other etching roll shaft 31B through gears 38 and to the registering roll shaft 29 and feed roll shaft 26 from a sprocket 35 on the shaft 31B through a chain 36 and sprockets 37 (Figure 7), all four rolls being driven at the same peripheral speed.

The presser roll 27 is carried by a lever 39 pivoted at one end 40 to the panel 23 and is pressed down on to the feed roll 25 by a counterweight 41 at the other end of the lever 39. Strip 42, previously punched with locating apertures, is fed between the feed and presser rolls from a supply spool 43 rotatable on a spindle 44 secured to the end plate 12 of the frame, and rotation of the feed roll thus draws the strip from the spool. From the feed the strip passes to the registering roll 28, between which and the feed rolls is space for a loop 45 of slack strip, the registering roll having a series of peripheral protuberances 46 which mesh with the locating apertures in the strip. From the registering roll the strip passes vertically downwards between the etching rolls 30, which are covered with a series of rubber pads 47 of the required pattern to be etched.

The etching roll shaft 31A (Figure 7) is mounted in a bracket 48 slidable on a support 49 under the control of a screwed rod 50 protruding from the feed end of the machine. Each roll 30 is moistened with acid by a roller 51 (Figures 10 and 11) fed with a wick 52 from a trough 53 of acid resisting material, pressure between the rolls 51, 30 being adjusted by a screw 54 acting through a spring 54A an adjustable stop 54B limiting the downward movement of the trough 53 about a pivot 54C.

The screwed rod 50 provides for adjustment of pressure by the etching rolls 30 on the strip 42 passing between them.

The brushing unit (Figures 1, 3, 8 and 9) carried by the panel 24 comprises a pair of rotatable brushes 55A, 55B and an upper jockey roller 56. The brush 55A is mounted on a drive shaft 57 the inner end of which is fitted with a pulley 58 and is driven from a pulley 59 on the layshaft 19 through a belt 60. The jockey roller 56 is mounted on an inter-

mediate stub shaft 61, carried by the panel 24, to which the drive is taken from the shaft 57 through a belt 62. The brush 55B is mounted on a shaft 63 which is hung by a pendulum arm 63A from the intermediate shaft 61, from which it is driven through a crossed belt 64.

Below the etching and brushing panels, a washing tank 65 is carried on a forward extension 66 of the base plate 14 of the frame, and from the etching rolls 30 the strip 42 is fed between the rotatable brushes 55A, 55B through a slack loop 67 which dips into the washing tank. From the brushes the strip passes upwards over the jockey roller 56, running idly on the stub shaft 61 projecting forwardly from the panel 24, the brushes rotating against the directions of the motion of the strip between them. The pendulum brush 55B maintains pressure on the strip 42 notwithstanding wearing of the brushes. The brushes are enclosed within a hood 68 formed in two halves as shown to allow passage of the strip 42.

Between the etching and brushing panels, space is left for a drying loop 69 in the strip 42 formed by the strip passing over two fixed rollers 70, overhanging from the top plate 15 of the frame and insulated from the latter, and around an intermediate lower roller 71, insulated from the front plate 11 of the frame and adjustable vertically along guides 72 fixed to the front plate to permit variation in the length of the drying loop.

To each side of the insulated rollers 70 a pair of contact pads is mounted, the lower pad 73 (Figures 4 and 5) of each pair being carried by a plate 74, fixed to and insulated from the top plate 15 of the frame, so as to overhang from the top plate in line with the insulated rollers, and the upper pad 76 of each pair being connected to the lower pad 73 by parallel links 77 at the rear of the pads. A transformer 78 mounted within the frame 10 has a low-voltage output coil which is connected to the two contact pads through a control switch 79 mounted on the front plate 11, so as to apply a low-voltage current to raise the temperature of the lengths of strip extended between them in the drying loop 69.

From the jockey roller 56 of the brushing unit the strip 42 is fed over a jockey pulley 80, overhanging from the top plate 15 of the frame, between the upper and lower pads 74, 76 of the one pair of contact pads, and thence into the drying loop 69. From the drying loop it passes through the other pair of contact pads and then between pull-through nip rolls 81, 82 from where it is fed finally to a coiling pulley 83. The rolls 81, 82 may

overhang from rear bearings to permit insertion of the strip from the front of the rollers.

The pull-through rolls 81, 82 are mounted in a frame 84 secured to the top plate 15 of the frame, the lower roll 81 being carried by a drive shaft 85 which is fitted with a pulley 86 driven from the pulley 33 on the lay-shaft 19 through a belt 87, and the upper roll 82 being adjustable, by adjusting screws 88, to adjust the pressure on the strip 42 passing between the two rolls. The coiling pulley 83 is mounted on the forward end of a shaft 89 journaled in bearings 90 secured along the upper edge of the end plate 12 of the frame and driven by a slipping belt 91 from a pulley 92 on the pull-through roll shaft 85. A belt guard 93 encloses the belt 91 and pulley 86. The rolls 81, 82 and the pulley 83 are insulated from the frame.

Figure 6 shows a typical mounting of overhanging driven rolls, such as 25 from the panel plate 23. The roll shaft 26 carrying the drive sprocket 37 is mounted in spaced bearings 94 on a bracket 95 secured by welding to the panel 23.

In operation of the machine, the pull-through nip rolls 81, 82 rotatable at the same peripheral speed as the rolls of the etching unit draw the etched strip from the loose loop 67 formed by the delivery of the strip from the etching rolls into the washing tank 65, past the brushing rolls, and through the contact pads and intermediate drying loop and finally on to the coiling spool. A switch 96 on the side plate 12 of the machine controls the driving motor. The independent switch 79 enables current to be applied to the drying loop 69 after the strip has been set in motion, to avoid overheating.

By adjustment of the pulley 71, the length of the drying loop 69 may be altered, which, with changing the tapings of the transformer 78, enables the amount of residual water carried by the strip beyond the brushes 55A, 55B to be completely evaporated.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An etching machine for marking razor blades in the form of continuous strip comprising a registering roller having protuberances meshing with apertures in the strip, an etching roll or pair of rolls for applying etching material to one or both sides of the strip and adapted to be driven at the same peripheral speed as the registering roller, means for washing etching material from the strip, and

drying means in the form of insulated contact pads spaced apart longitudinally of the strip and adapted to be supplied with low-voltage current to raise the temperature of the length of the strip extended between them.

2. A machine as in Claim 1, wherein the various rollers over or between which the strip is guided are overhung from the machine frame to facilitate leading the strip into the machine.

3. A machine as in Claim 2, wherein all endwise threading of the strip is eliminated.

4. A machine as in Claims 1, 2, or 3, wherein the contact pads each comprise a pair of pad members, one of which is movable with respect to the other so as to present a gap into which the strip may be inserted from the side.

5. A machine as in Claim 4, wherein the contact pads each comprise an upper and a lower pad interconnected by parallel links on their rear side.

6. A machine as in any of the preceding Claims, wherein the drying run of the strip is arranged as a loop and the etching and washing runs are arranged in a larger loop surrounding the drying loop.

7. A machine as in Claim 6, wherein the feed and delivery points of the machine are adjacent each other.

8. A machine as in any of the preceding Claims, comprising an open-backed box frame, two apertures in a front vertical plate of the frame being closed by panels carrying etching and brushing units respectively, with drive shafts protruding rearwardly through the apertures into the box to be driven by a motor mounted within the box, and operating members protruding forwardly of the machine.

9. A machine as in Claim 8, wherein the brushing panel carries two rotatable brushes rotatable against the direction of motion of the strip between them.

10. A machine as in Claim 9, wherein one brush has a fixed axis from which a drive is taken to an intermediate shaft from which the other brush is hung pendulum-fashion and from which it is driven.

11. A machine as in Claim 8 to 10, wherein the drying loop is formed between the two panels by two fixed insulated rollers overhanging from the top plate of the frame and an intermediate lower inclined roller.

12. A machine as in Claim 11, wherein the lower insulated roller is adjustable to permit variation of the length of the strip in the drying loop.

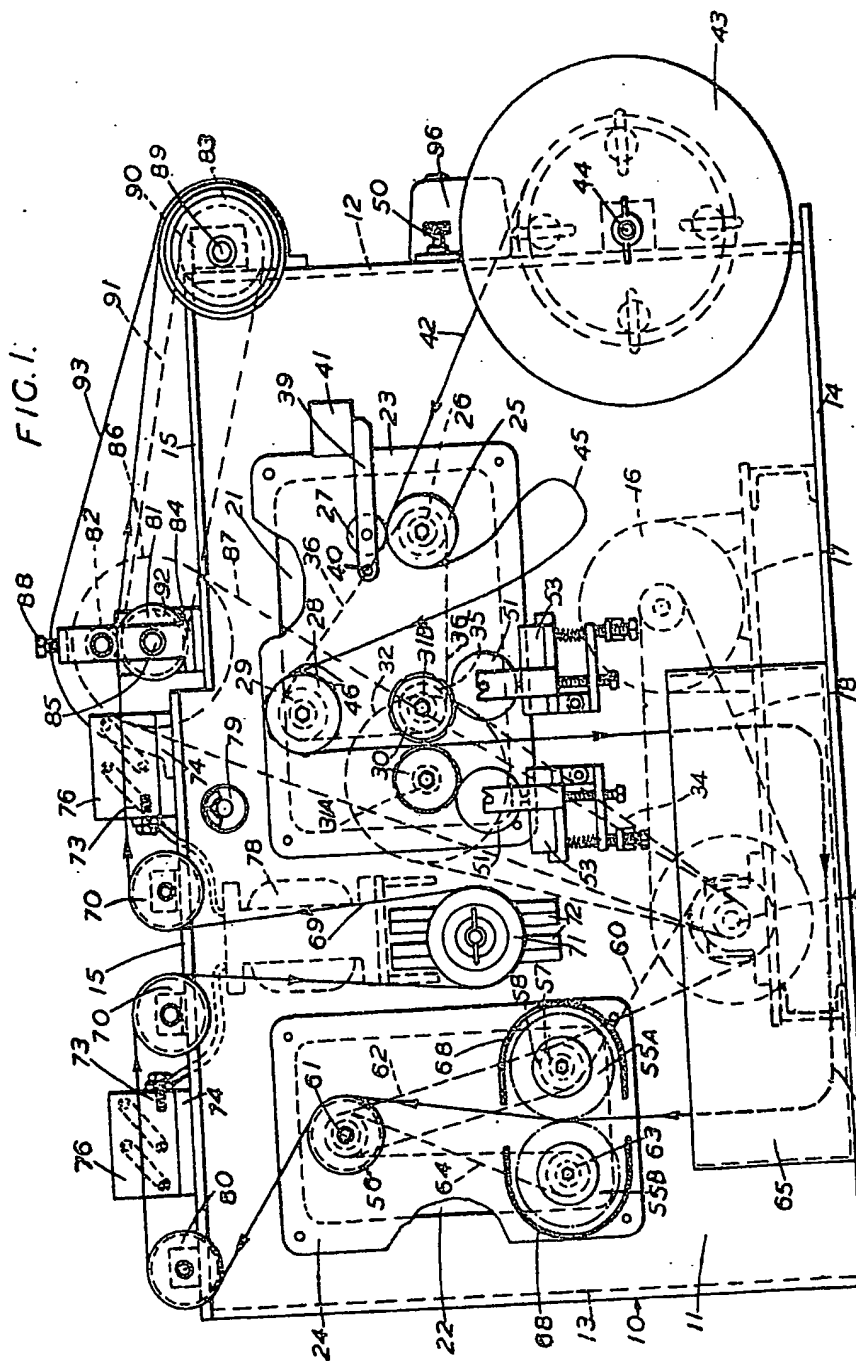
13. A strip etching machine substantially as hereinbefore described and illus-

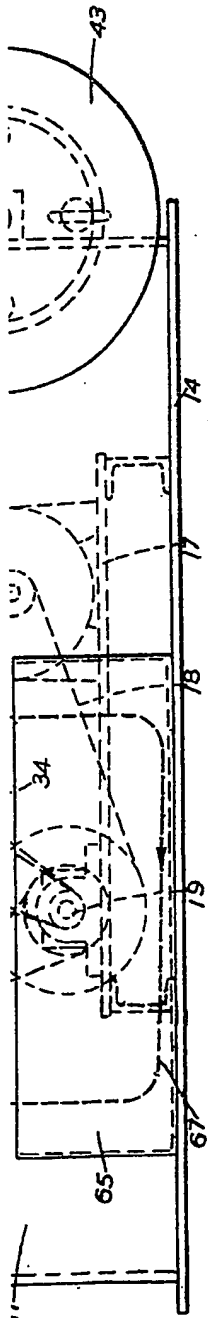
trated with reference to the accompanying
drawings.

Dated this 7th day of May, 1947.
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Chartered Patent Agents,
Town Hall Chambers,
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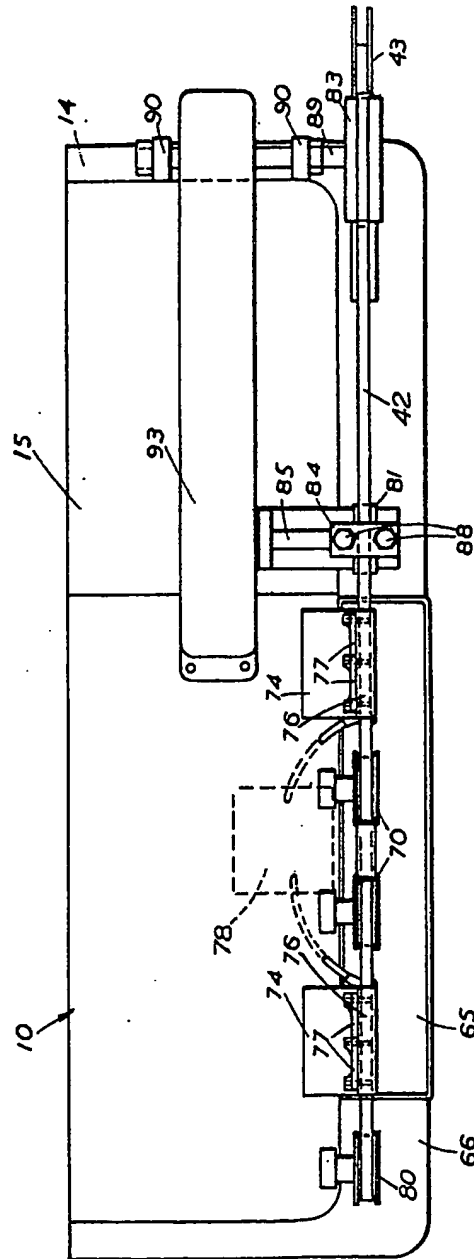
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SHEET 1

FIG. 2.



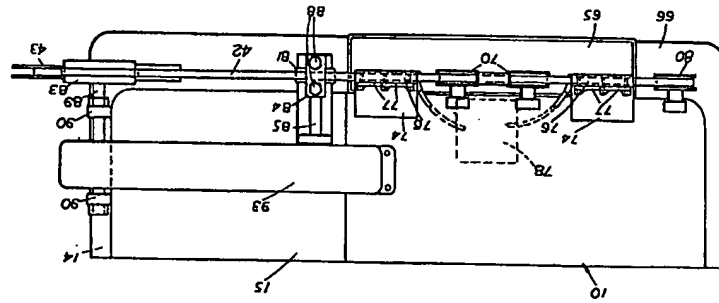


FIG. 2

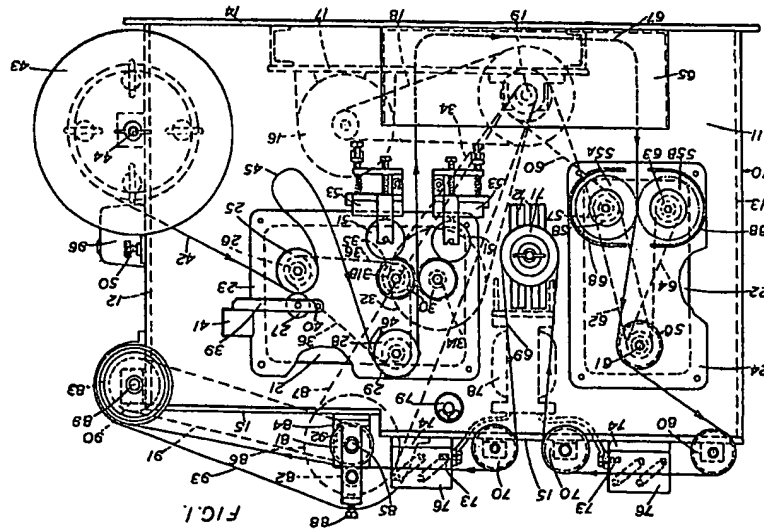
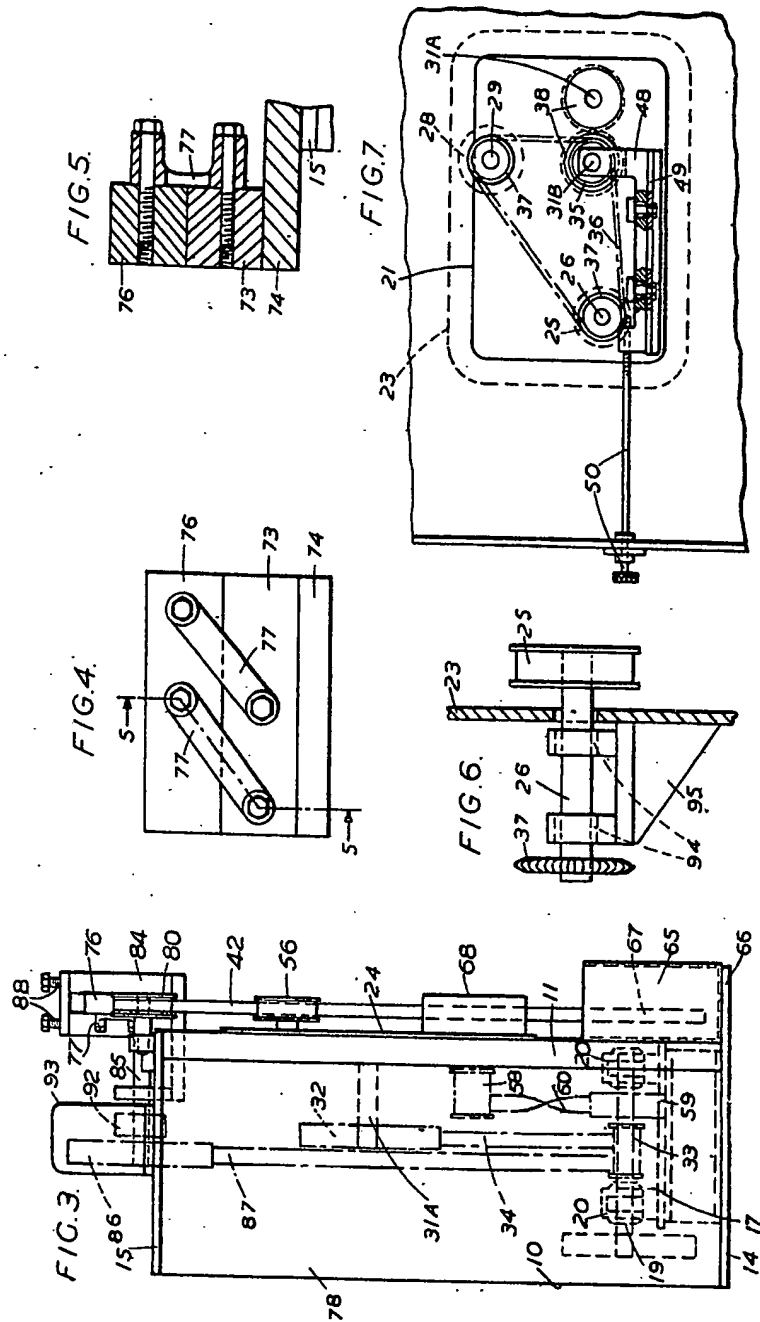


FIG. 1

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FIG. 8.

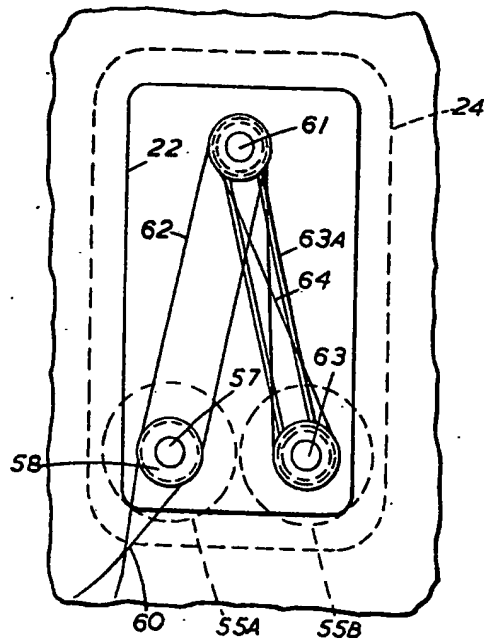


FIG. 9.

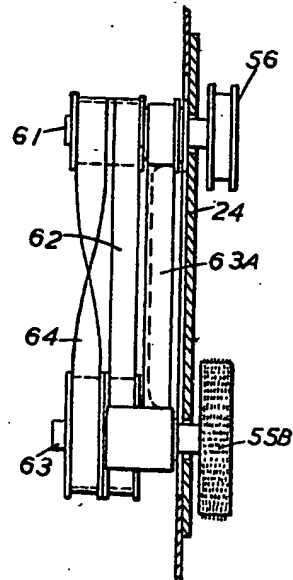


FIG. 10.

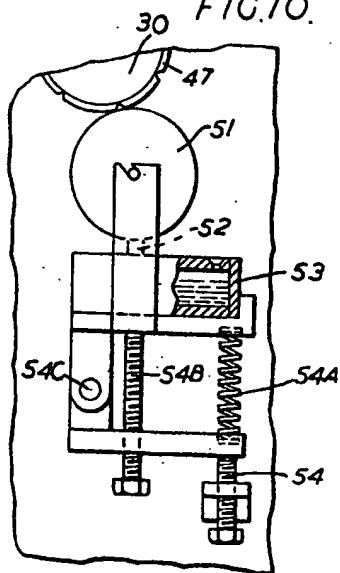
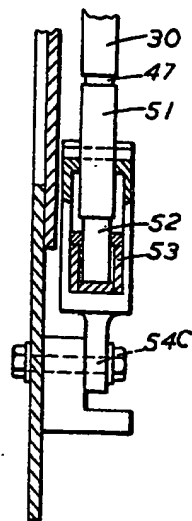


FIG. 11.



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